



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE

United States Patent and Trademark Office

Address: COMMISSIONER FOR PATENTS

P.O. Box 1450

Alexandria, Virginia 22313-1450

www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/580,890	05/25/2006	Sun Yang Kook	1109-003	7135
39600 7590 12/15/2009 SOFFER & HAROUN LLP. 317 MADISON AVENUE, SUITE 910 NEW YORK, NY 10017				
EXAMINER				
TURNER, KATHERINE ANN				
ART UNIT		PAPER NUMBER		
1795				
MAIL DATE		DELIVERY MODE		
12/15/2009		PAPER		

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary**Application No.**

10/580,890

Applicant(s)

YANG KOOK ET AL.

Examiner

Katherine Turner

Art Unit

1795

Period for Reply -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 October 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-6 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-6 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 May 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/22)
- 4) ☐ Interview Summary (PTO-413)
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____
- Paper No(s)/Mail Date 5/25/2006

DETAILED ACTION

Response to Amendment

1. The amendment filed October 5, 2009 has been entered. Claims 1-6 are pending. Claim 1 is amended. Claims 7-15 are cancelled.

Election/Restrictions

2. Applicant's election of Group I, claims 1-6 in the reply filed on October 5, 2009 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)). The amendment filed October 5, 2009 has cancelled claims 7-15 drawn to non-elected invention.

Priority

3. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Information Disclosure Statement

4. The listing of references in the specification is not a proper information disclosure statement. 37 CFR 1.98(b) requires a list of all patents, publications, or other information submitted for consideration by the Office, and MPEP § 609.04(a) states, "the list may not be incorporated into the specification but must be submitted in a

separate paper." Therefore, unless the references have been cited by the examiner on form PTO-892, they have not been considered.

Claim Objections

5. Claim 1 is objected to because of the following informalities: the first formula listed has "Mn" in subscript, this seems to be a typographical error. Appropriate correction is required.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

8. Claims 1-2 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ohzuku et al. (US 2003/0170540).

Regarding claim 1, Ohzuku et al. discloses a process for preparing a positive electrode active material for a lithium secondary battery (paragraphs 138, 211, and 212) using a positive electrode active material of $\text{LiNi}_{1/3}\text{Mn}_{1/3}\text{Co}_{1/3}\text{O}_2$ (paragraph 212; table 5), which meets Applicant's formula $\text{Li}_{1+\delta}[\text{Ni}_x\text{Mn}_{x+y}\text{Co}_{1-2(x+y)}\text{M}_y]\text{O}_{2-a}\text{P}_a$ ($\delta=0$, $x=1/3$, $y=0$, $z=0$, and $a=0$), comprising the steps of: simultaneously, adding nickel sulfate, manganese sulfate and cobalt sulfate (Applicant's metal precursors), an aqueous ammonia solution and a NaOH basic solution to a reaction bath (6) of the apparatus (Applicant's reactor) and mixing and precipitating them to obtain a nickel manganese cobalt composite hydroxide as a precursor, wherein the apparatus (Applicant's reactor) has a structure in which an agitator with vanes (Applicant's rotary vanes), which agitate, thus direct the liquid and baffles directing the aqueous solution out of the apparatus (Applicant's reactor) opening are spaced apart from the inner wall of the apparatus (Applicant's reactor); and mixing and reacting the nickel manganese cobalt composite hydroxide with lithium hydroxide (Applicant's lithium precursor) to obtain $\text{LiNi}_{1/3}\text{Mn}_{1/3}\text{Co}_{1/3}\text{O}_2$ (Applicant's lithium metal composite oxide) (figures 1 and 4; paragraphs 1, 85-88, 96-103, 138, 211, 212; table 5), but is silent as to the rotary vanes being the reverse vane type. Please see annotated figures 1 and 4 below.

Collins English Dictionary (Collins English Dictionary, 2000, [online], [retrieved on 2009-12-10], Retrieved from Credoreference using Internet <URL: <http://www.credoreference.com/entry/hcengdict/vane>>) evidences that a vane is any flat or shaped plate used to direct fluid flow (vane entry).

Chambers 21st Century Dictionary (Chambers 21st Century Dictionary, 2001, [online], [retrieved on 2009-12-10], Retrieved from Credoreference using Internet <URL: <http://www.credoreference.com/entry/chambdict/baffle>>) evidences that a baffle is a device for controlling the flow of liquid through an opening (baffle entry).

Ohzuku et al. also discloses that there are two experimental apparatus' (Applicant's reactors) the one shown in figure 4 and the one shown in figure 1; the agitator (3) with vanes (Applicant's rotary vanes) of figure 1 causes the flow to be downward; while the agitator with vanes (Applicant's rotary vanes) of figure 4 causes the flow to be upward (figures 1 and 4; paragraphs 85-88 and 96-103). Thus, one of these agitators with vanes (Applicant's rotary vanes) is in reverse from the other. It would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize either experimental apparatus (Applicant's reactors), one having a reverse type agitators with vanes (Applicant's rotary vanes) from the other, because Ohzuku et al. discloses that both of these are used to produce positive active materials by the coprecipitation method (figures 1 and 4; paragraphs 85-88 and 96-103). Please see annotated figures 1 and 4 below.

FIG. 1 (annotated)

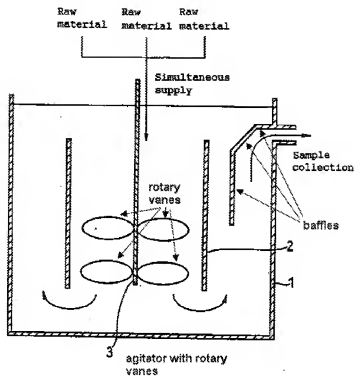
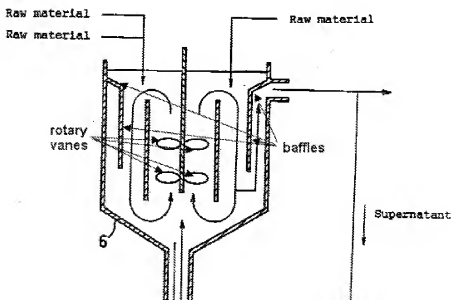


FIG. 4 (annotated)



Regarding claim 2, Ohzuku et al. discloses the aqueous solution containing nickel sulfate, manganese sulfate and cobalt sulfate, which is three metal salts being used as the metal precursor (paragraphs 211-212).

9. Claims 3-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ohzuku et al. (US 2003/0170540) as applied to claims 1-2 above, and further in view of Tanigawa et al. (US 2002/0164527).

Regarding claim 3, Ohzuku et al. discloses the concentration for the aqueous ammonia solution is 4.8 mol/liter, the concentration of the aqueous nickel sulfate is 1.2 mol/liter, the concentration of the aqueous manganese sulfate is 1.2 mol/liter, and the concentration of the aqueous cobalt sulfate is 1.2 mol/liter (paragraph 211), but is silent as to the concentration of the aqueous ammonia solution is between 0.2 and 0.3 of the aqueous metal solution.

Tanigawa et al. teaches a process for making a positive electrode active material with precipitation of a nickel hydroxide powder from an aqueous solution containing nickel ion and at least an ion of Co or Mn, and that it is possible to manipulate the composition, particle circularity, particle size, specific surface area and crystallinity of the obtained active material by managing and controlling the concentration, pH, and retention time of the aqueous solution in the reaction vessel (paragraph 58-61). It would have been obvious to one of ordinary skill in the art at the time the invention was made to vary concentration of the aqueous solution in the reaction vessel, because Tanigawa et al. teaches that by managing and controlling the concentration of the aqueous

solution in the reaction vessel it is possible to manipulate the composition, particle circularity, particle size, specific surface area and crystallinity of the obtained active material (paragraph 58-61). *Discovery of optimum value of result effective variable in known process is ordinarily within skill of art.* In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Regarding claim 4, Ohzuku et al. discloses the aqueous solution containing nickel sulfate, manganese sulfate and cobalt sulfate (Applicant's metal precursor) being fed into the apparatus (Applicant's reactor) at a rate of 0.5 milliliter/minute (paragraph 211), but is silent as to the retention time in the apparatus (Applicant's reactor).

Tanigawa et al. teaches a process for making a positive electrode active material with precipitation of a nickel hydroxide powder from an aqueous solution containing nickel ion and at least an ion of Co or Mn, and that it is possible to manipulate the composition, particle circularity, particle size, specific surface area and crystallinity of the obtained active material by managing and controlling the concentration, pH, and retention time of the aqueous solution in the reaction vessel (paragraph 58-61). It would have been obvious to one of ordinary skill in the art at the time the invention was made to vary the retention time of the aqueous solution in the reaction vessel, because Tanigawa et al. teaches that by managing and controlling the retention time of the aqueous solution in the reaction vessel it is possible to manipulate the composition, particle circularity, particle size, specific surface area and crystallinity of the obtained active material (paragraph 58-61). *Discovery of optimum value of result effective*

variable in known process is ordinarily within skill of art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Regarding claim 5, Ohzuku et al. discloses 4.8 mol/liter of aqueous NaOH (Applicant's basic solution) being added to the apparatus (Applicant's reactor) (paragraph 211), but is silent as to the aqueous NaOH (Applicant's basic solution) being added to make a pH of 11.0 to 11.5.

Tanigawa et al. teaches a process for making a positive electrode active material with precipitation of a nickel hydroxide powder from an aqueous solution containing nickel ion and at least an ion of Co or Mn, and that it is possible to manipulate the composition, particle circularity, particle size, specific surface area and crystallinity of the obtained active material by managing and controlling the concentration, pH, and retention time of the aqueous solution in the reaction vessel (paragraph 58-61). It would have been obvious to one of ordinary skill in the art at the time the invention was made to vary the pH of the aqueous solution in the reaction vessel, because Tanigawa et al. teaches that by managing and controlling the pH of the aqueous solution in the reaction vessel it is possible to manipulate the composition, particle circularity, particle size, specific surface area and crystallinity of the obtained active material (paragraph 58-61). *Discovery of optimum value of result effective variable in known process is ordinarily within skill of art. In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

10. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ohzuku et al. (US 2003/0170540) in view of Tanigawa et al. (US 2002/0164527) as applied to claims 1-5 above, and further in view of Sun et al. (US 6,071,489).

Ohzuku et al. discloses mixing and reacting the nickel manganese cobalt composite hydroxide with lithium hydroxide (Applicant's lithium precursor) to obtain $\text{LiNi}_{1/3}\text{Mn}_{1/3}\text{Co}_{1/3}\text{O}_2$ (Applicant's lithium metal composite oxide) (paragraphs 211 and 212), but is silent as to a chelating agent being used in the step of obtaining the lithium metal composite oxide.

Sun et al. teaches glycolic acid being used as a chelating agent in the step of preparing the lithium cathode active material, so that a pure phase of lithium cathode active material powder is prepared (column 12, lines 29-35). It would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize glycolic acid as a chelating agent in the step of forming the lithium positive electrode active material, which is the lithium metal composite oxide, because Sun et al. teaches glycolic acid being used as a chelating agent in the step of preparing the lithium cathode active material, so that a pure phase of lithium cathode active material powder is prepared (column 12, lines 29-35).

Correspondence/Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Katherine Turner whose telephone number is (571)270-5314. The examiner can normally be reached on Monday through Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dah-Wei Yuan can be reached on (571)272-1295. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/K. T./
Examiner, Art Unit 1795

/Dah-Wei D. Yuan/
Supervisory Patent Examiner, Art Unit 1795